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Causes analysis on the serious defect of enterprise environmental responsibility ——Based on the perspective of law and economics

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Abstract. As the important Environmental Interests of Subjects, enterprises behoove to undertake the corresponding responsibility of Pollution Control and Environmental Protection. The current situations in our country, however, appear as the serious lack of enterprise environmental responsibility. Based on the analysis of law and economics, this article reaches the conclusion through game analysis and cost-benefit analysis that the prisoners dilemma of environmental interest game between enterprises is the inherent causes for the serious defect of enterprise environmental responsibility. Meanwhile, at the point of cost-benefit, the externality of environment illegal act results in the imbalanced cost-benefit, lacking of the motivation to control pollution and protect environment in an active way.

1. Introduction

The development and changes of modern society makes the environmental interest subject grow diversified increasingly, and the environmental interest also shows the features of diversity and multi-level nature at the same time. According to the differences between the parties of the right configuration, the environmental interest subject can be divided into government, enterprises and the public. The responsibility of public mentioned in [1,2] are just for consultation so that the author can better understand the differences between the three parties and pick out the special points of enterprises, which are the main focus of this text. The parties have different demands for environmental interest. The government and enterprises try to obtain more creative environmental interest from natural resources and pay more attention to the economic benefits brought by the environment, while the public are always pursuing better natural environment from their own welfare perspective. As the important Environmental Interests of Subjects, government, enterprise and public behoove to undertake the corresponding responsibility of Pollution Control and Environmental Protection. The current situations in our country, however, appear as government environmental responsibility failure, the serious lack of enterprise environmental responsibility and the weak awareness of the public environmental rights. I've consulted references 3 to 5 and attached the importance to detailed clauses on national environmental laws and how they work. There are detailed clauses on national environmental laws for the performing methods of enterprises' environmental responsibility and the punishment to polluted-enterprises, currently, the national regulation in use are mainly the standard emission, environmental influence evaluation, three simultaneousness and emission license, all above are the fixed environmental legal obligations designed for enterprises



directly. However, enterprises haven't really taken their environmental responsibilities they should do yet as a double subject containing environmental and economic interest. Hereby, in this article, we research the inherent causes mainly for the serious defect of enterprise environmental responsibility.

2. Environmental benefit game easily falls into prisoners dilemma among enterprises

Take the process of the environmental interests game between two enterprises as an example, suppose A and B manufacture the homogeneous products with the same marginal cost, the profit for an unit product is R , the additional payment costs which are used to equipment and labor input for waste treatment is D . Then the competitive relationship is formed between enterprises, concretely, the profit situation of the environmental interests game between enterprise A and B can be reflected in table 1 below.

Table 1. Profit matrix of environmental interest game among enterprises.

		Enterprise B	
		Direct pollution discharge	Processed emission
Enterprise A	Direct pollution discharge	(R, R)	$(R, R - D)$
	Processed emission	$(R - D, R)$	$(R - D, R - D)$

As shown in table 1, when enterprise A and B face the choices of direct emission and waste treatment, the possible results of the game may as follows:

- When both A and B don't implement the waste treatment actively, that is, both of them don't input the equipment, labors and do not pay the cost D , then both parts will earn total productive profits R ;
- If one of them input the treatment cost, and implement the waste treatment actively, then his profits will be decreased while the profits for another enterprise still keeps unchanged, in this condition, the integrated benefits of A and B is $(R, R - D)$ or $(R - D, R)$, their benefits are unequal, the enterprise who implements the waste treatment actively always undertakes the payment cost;
- If both A and B take their environmental responsibilities actively and input the costs to implement the waste treatment at the same time, then the benefits they get are equal, all are $R - D$.

As mentioned above, in the case of no governmental regulation and supports, the enterprises, as the rational subject, prefer not to implement the waste treatment and keep polluting without any costs input on pollution treatment in order to pursue the maximum profit. Meanwhile, if one of enterprises (for example A) pay for the pollution treatment payment costs, then it will make up for the losses of profits by putting up the product's price, thus, the consumers will choose the product B which is homogeneous and lower price definitely, and then A will lose its competitiveness in the market due to the waste treatment. Besides, if both A and B input the equipment and labors to deal with the waste, then both of them will suffer from the loss of profits. In this condition, any of enterprises doesn't have the motivation to control pollution actively. Therefore, for enterprise A and B, no matter what choice the other makes, its best strategy is always discharging pollution directly, this time, both parties of the game go into Nash Equilibrium, which will be reached when participants are not willing to change their strategies in giving other participants an optimal strategy. From total benefits, this tacit understanding will be kept between enterprises if no external force destroy this balance, enterprises will expand their production and never take any action to waste treatment in order to get much more profits, it makes the local ecologic environment get worse and worse and causes the public environmental interests injured seriously,

finally falling into the prisoners dilemma [3,4] That is a special game between two arrested prisoners, illustrating why it is still difficult to maintain cooperation even when this cooperation is beneficial for both parties. It is the most representative case in the game theory, reflecting that personal optimum choice is not group optimum choice.

3. Enterprises perform the imbalanced cost-benefit of environmental responsibility

The cost for enterprises performing environmental responsibility is from the expenditure which is used to waste treatment and environmental protection activities and so on in order to respond to the environmental protection goal of country, including the additional cost input which is used to improve productive technology, introduce advanced equipment for emission reduction and the relevant managing cost. In addition, view from the opportunity cost, the cost of increased production and the related competitiveness enhanced caused by purchasing equipment and developing environmental protection activities belong to the cost of performing environmental responsibility, too. The benefits of performing environmental responsibility are the promotion of total social interests including the quality improvement of air and water and so on in a certain place when enterprises take their environmental responsibility completely. Accordingly, when enterprises don't take environmental responsibility, they will have the emission against the legal standard and not pay the relevant sewage charge in the process of production and management, this time, the benefits they obtain are the cost saving that they never get punished and sanctioned and the price advantage that they win in the marketable competition.

Suppose the output of enterprises is constant in a period, then the emission load and required pollution charge will keep unchanged. As shown in figure 1, the point A in figure shows the budget for enterprises' pollution charge, the point F shows the fine to be equivalent to pollution charge A. Assume the cost budget for enterprises taking environmental responsibility (including the pollution abatement cost and the fine without pollution abatement) is M, then the constraint formula of polluter for budget cost is $A + F \leq M$.

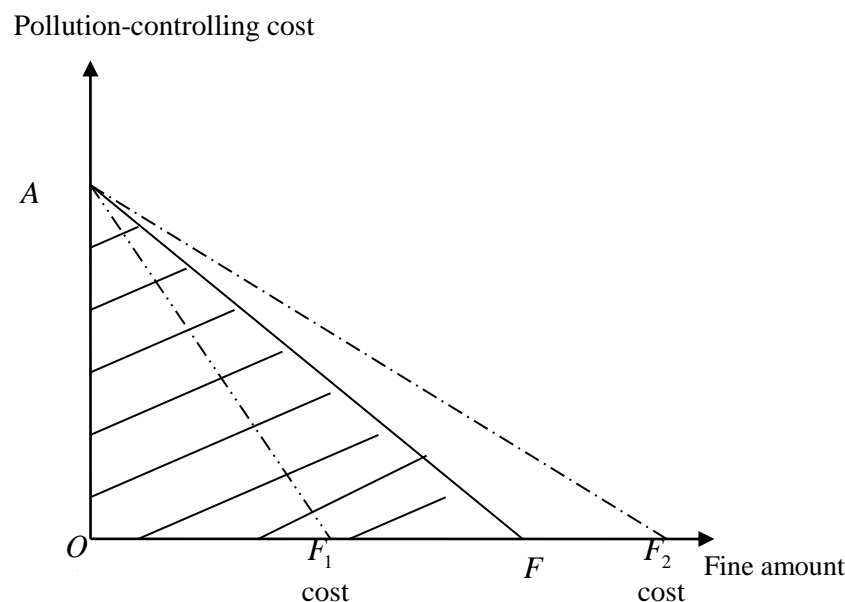


Figure 1. Pollution-controlling cost and fine budget for enterprises.

Under the premise of the above assumption, the budget range of enterprises for pollution abatement cost and fine is equivalent to the shaded area of $\triangle AOF$. When the fine is F_1 ($F_1 < F$), the budget of enterprises are surplus, thus the enterprises get benefits and will not input the pollution abatement cost. When the fines are out of budget constraint AF , for example, it is on point F_2 ($F_2 > F$), the enterprises not

only input the pollution abatement cost A but also need to input the additional fines in order to perform their environmental responsibility, in this condition, the cost for performing environmental responsibility exceed the original budget, the enterprises will face the choices for increasing the pollution abatement cost to reduce the fines or not performing environmental responsibility.

From the significant environmental pollution events happened in recent years, it is a commonplaceness that the cost-benefit unbalance occurs for enterprises' lost performing environmental responsibility [5]. For example, in the significant water pollution events happened in Tuojiang River, Sichuan province, Sichuan chemical company Ltd. produced and discharged the pollutant excessively to cause Tuojiang River polluted seriously, this resulted in 200 million yuan economic losses, but environmental law enforcement only issued one million fine according to the relevant maximum fines. In nature, the punishment this enterprise took for its illegal emission and emission cost saving was far from making up the losses to ecological environment and public life for these events. This shows that the tiny fines encourage enterprises to take to the woods actually, the legal maximum fines results in the cost that the enterprises don't perform environmental responsibility is much less than the benefits they get by emission without limitation and not managing wastes, the serious unbalanced cost-benefit existed for the enterprises' performing their environmental responsibility, it results in serious responsibility vacancy of the enterprises' environmental responsibility in the end and become an important barrier in the process of the total environmental interests and ecological civilization construction.

4. Conclusion

As the important Environmental Interests of Subjects, enterprises behoove to undertake the corresponding responsibility of Pollution Control and Environmental Protection. The current situations in our country, however, appear as the defect of enterprise environmental responsibility. The issues of ecological damage and environmental pollution get worse and worse and the total environmental interests get injured seriously because of the defect of enterprise environmental responsibility. According to this, this article make the conclusions based on the perspective of law and economy that, as for enterprises, there are Nash Equilibrium existing in environmental interests game between enterprises, in the view of total benefits, enterprises will maintain tacit understanding if there are not any external force to break this equilibrium, they will expand their production without waste disposal in order to make as much profit as possible, thus, local ecological will get worse and worse and the collective environmental interests get injured seriously. Based on perspective of cost-benefit, there are severe imbalanced cost and benefit in environmental illegal action, thus makes all the enterprises lack of the motivation to treatment pollution and protect environment actively. The tiny fines encourage enterprises to take to the woods actually, the legal maximum fines results in the cost that the enterprises don't perform environmental responsibility is much less than the benefits they get by emission without limitation and not managing wastes, the serious unbalanced cost-benefit existed for the enterprises' performing their environmental responsibility, it results in serious responsibility vacancy of the enterprises' environmental responsibility in the end and become an important barrier in the process of the total environmental interests and ecological civilization construction.

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